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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,379	12/21/2001	Hongbin Ji	83818-278123 TEN-009(U)	5476
27498	7590	04/03/2006	EXAMINER DYKE, KERRI M	
PILLSBURY WINTHROP SHAW PITTMAN LLP P.O. BOX 10500 MCLEAN, VA 22102			ART UNIT 2616	PAPER NUMBER

DATE MAILED: 04/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/032,379

Applicant(s)

JI ET AL.

Examiner

Kerri M. Dyke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because there are numerous errors:

- a. Figure 1 is referred to as figure 7 in page 7 line 12 of the specification.
- b. Figure 1 elements 645 and 650 are not in the specification.
- c. Figure 1 element 655 is not in the drawing.
- d. Figures 2A and 2B are referred to as figures 8A and 8B in page 8 line 14.
- e. None of the elements from figures 4, 5, 7, 8A, and 8B are in the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities: There are errors in the related applications section. The instant application does not claim priority to application

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60/249,627. Also, the relationship, (i.e. continuation, divisional, copending), with respect to application 09/780,895 should be clarified.

Appropriate correction is required.

### ***Double Patenting***

3. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

4. Claims 10-13 and 15 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 9-12 and 14 of prior U.S. Patent No. 6,888,838. This is a double patenting rejection.

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 7 and 8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6 and 7 of U.S. Patent No. 6,888,838 in view of Gupta et al. ("Routing Lookups in Hardware at Memory Access Speed") hereinafter Gupta. The only difference between the claims of the instant application and those in patent 6,888,838 is the addition of the clause "the first portion of the IP destination address is at least 16 bits long and the length of the second portion of the IP destination address is 32 bits less the length of the first portion." Gupta discloses the assumption that IPv6 is still a ways off in assumption 4 on page 1240. It would have been obvious to one of ordinary skill in the art to use an IP address with 32 total bits because IPv4 uses 32 bit addresses. Figure 1 of Gupta is prefix length distribution chart. It shows that the vast majority of prefixes (first portions) are at least 16 bits long. It would have been obvious to one of ordinary skill in the art to use prefixes of 16 bits or more because the vast majority of prefixes already fall within this range, as shown by figure 1.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-6, 9, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Gupta et al. ("Routing Lookups in Hardware at Memory Access Speed") hereinafter Gupta.

9. In regards to claim 1, Gupta discloses in figures 2-4 and on page 1241-1242 a computer-readable storage medium (DRAM) configured to store a data structure, the data structure comprising:

a first lookup table having at least one entry, each of the at least one entry having an information storage portion (fig. 2, TBL 24); and

a second lookup table having at least one block of entries, each entry in the at least one block of entries storing next hop and prefix length information (fig. 2, TBLlong);

wherein each at least one entry in the first lookup table is indexable by a segment of an IP destination address, the segment being at least sixteen bits long (example 3.1 on page 1242, where a packet arrives with a destination address 10.54.34.23. The first 24 bits are used as an index into TBL24.),

the information storage portion of each of the at least one entry in the first lookup table stores next hop and prefix information when there is no route having a prefix matching the index of the entry and a prefix length greater than a predetermined value (figures 2-4, section 3 on page 1241 and in example 3.1 on page 1242. If X is less than or equal to 24 bits long, it need only be stored in TBL24, in effect, route prefixes shorter than 24-bits are expanded. If a packet arrives with the destination address 10.54.22.147, the first 24 bits are used as an index TB24, and will return an entry with the correct next hop (A)).

the data storage portion of each of the at least one entry in the first lookup table stores a value pointing to a block in the at least one block of entries in the second lookup table when there is a route having a prefix matching the index of the entry a prefix length greater than the predetermined value (figure 4 and example 3.1 on page 1242, Assume 10.54/16, 10.54.34/24 and

10.54.34.192/26 are already in the table. The first route requires entries in TBL24 that correspond to the 24-bit prefixes 10.54.0 through 10.54.255 (except for 10.54.34). The second and third routes require that the second table be used because both of them have the same first 24bits and one of them is more than 24bits long. So, in TBL24, we insert a one followed by an index into the entry corresponding to the 10.54.34 prefix. In the second table, we allocate 256 entries starting with memory location  $123 \times 256$ ), and

each entry in the block is indexable by an offset of the IP destination address, the offset being 32 bits long less the length of the segment (figure 4, each entry number of the IP destination address is indexable by an offset, e.g. 10.54.33, 10.54.34, 10.54.35. Figure 2 shows the offset as 8 bits or 32 less the segment length of 24.).

10. In regards to claim 2, Gupta discloses the storage medium of claim 1, each of the at least one entry in the first lookup table including a marker bit indicating whether there is a route having a prefix matching the index of the entry and a prefix length greater than a predetermined value (page 1241, section 3, If X is less than or equal to 24 bits long, it need only be stored in TBL24: the first (marker) bit of the entry is set to zero to indicated that the remaining 15 bits designate the next-hop. If , on the other had, the prefix X is longer than 24 bits, then we use the entry in TBL24 addressed by the first 24 bits of X. We set the first (marker) bit of the entry to one to indicated that the remaining 15 bits contain a pointer to a set of entries in TBLlong.).

11. In regards to claim 3, Gupta discloses the storage medium of claim 1, wherein the storage medium is operatively connected to a configurable processor (page 1241, item 5 and on page 1246 in section 5.3, a configurable processor is connected to memory).

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12. In regards to claim 4, Gupta discloses the storage medium of claim 1, wherein the segment length is 16 bits plus a number of bits necessary to uniquely determine an entry of one of the first and second tables corresponding to the IP destination address (section 3 page 1241 states that the first table, TBL24 stores all possible route prefixes that are up to, and including, 24-bits long. Therefore, all possible 16-bit lengths are stored in TBL24. If more bits are necessary for unique identification they are included in either TBL24 (1-8 additional bits) or in TBLlong (9-16 additional bits)).

13. In regards to claim 5, Gupta discloses, in figures 2-4 and on page 1241-1242, a computer-readable storage medium (DRAM) configured to store a data structure, the data structure comprising:

- a first lookup table having at least one entry, each of the at least one entry having a bitmap portion and an information storage portion (fig. 2, TBL24); and

- a second lookup table having at least one entry, each entry in the at least one entry storing next hop and prefix length information (fig. 2, TBLlong);

- wherein the at least one entry in the first lookup table is indexable by a first portion of an IP destination address (example 3.1 on page 1242, where a packet arrives with a destination address 10.54.34.23. The first 24 bits are used as an index into TBL24), and bits within the bitmap of the at least one entry are indexable by a second portion of the IP destination address (example 3.1 on page 1242, where 10.54/16, with a subnet mask of 16 in the second portion of the address, the first route requires entries in TBL24 that correspond to the 24-bit prefixes 10.54.0 through 10.54.255 except for 10.54.34),



the information storage portion of the at least one entry stores next hop and prefix information when the total number of ones in the bitmap of the at least one entry is one of a given set of values (section 3 and figure 3 on page 1241, for a TBL24 entry, if longest route with 24 bit prefix is less than 25 bits long, the first bit of the entry is set to zero to indicate that the remaining 15 bits designate the next hop),

the information storage portion of the at least one entry stores information pointing to an entry in the second lookup table when the total number of ones in the bitmap of the at least one entry is not one of the given set of values (section 3 and figure 3 on page 1241, for a TBL24 entry, if longest route with 24bit prefix is greater than 25 bits long, the first bit of the entry is set to one to indicate that the remaining 15 bits contain a pointer to a set of entries in TBLlong); and

the first portion of the IP destination address is at least 16 bits long and the length of the second portion of the IP destination address is 32 bits less the length of the first portion (figure 2 shows the first portion as 24 bits and the second portion as 8 bits, i.e. 32 bits less the first portion length of 24 bits).

14. In regards to claim 6, Gupta discloses the storage medium of claim 5, wherein the first set of values includes one and two (as disclosed in figure 2-4).

15. In regards to claim 9, Gupta discloses in figures 2-4 a method of performing route lookup (on two tables in figure 2) and packet forwarding in a communications network (section 3 on page 1241 and examples 3.1 on pages 1242), the method comprising;

receiving an incoming IP address and dividing the address into segment and offset portions (example 3.1 on page 1242, where a packet arrives with a destination address 10.54.34.23. The first 24 bits are used as an index into TBL24, which indicates that the second

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table must be consulted, clearly establishing that the first lookup table is indexable by a segment of an IP destination address. The IP address is also dividing into offset portion as shown in TBL24 in figure 4 since the entry number 10.54.33 is followed by an offset of that address of 10.54.33);

using a value of the segment to index to a particular entry in a first data structure (section 3, the first table (called TBL24) stores all possible route prefixes that are up to and including, 24-bits long);

checking a marker bit (section 3, the first bit of the entry as the marker bit) of the entry;

if the marker bit is zero, obtaining next hop information and prefix length information for the IP address from the remaining bits of the entry (section 3 and figure 3, If X is less than or equal to 24 bits long, it need only be stored in TBL24; the first (marker) bit of the entry is set to zero to indicate that the remaining 15 bits designate the next hop);

if the marker bit is one, using the remaining bits of the entry to index to a block of entries in a second data structure, within the block of entries in the second data structure, using the offset to index to a particular entry (section 3 and figure 3, If the prefix X is longer than 24 bits, then we use the entry in TBL24 addressed by the first 24 bits of X. We set the first bit of the entry to one to indicate that the remaining 15 bit contain a pointer to a set of entries in TBLlong), and

obtaining next hop and prefix length information from the indexed entry in the second data structure (3<sup>rd</sup> paragraph, step 3 of page 1242, if the first bit equal one, we multiple the remaining 15 bits by 256, add the product to the last 8 bits of the original destination address and use this value as a direct index into TBLlong, which contains the next hop); and

using the next hop and prefix length information to forward a packet associated with the IP address to another location on a communications network (page 1241, item 5, in addition to figures 2-4, the next hop entries from routing table are downloaded by the general purpose processor into each forwarding table, which are used to make per-packet forwarding decision).

16. In regards to claim 14, Gupta discloses in figures 2-4 a method of updating a data structure for use in a route lookup system in a communications network, the method comprising:

receiving an IP route having an IP address component, prefix length component and next hop component (pages 1241 and 1242, of receiving a packet with a destination address, prefix length either greater, less than or equal to 24bits and a next hop component based on prefix length);

checking a group of entries in a data structure indicated by the prefix length component, the group having a size determined by a length of the IP address less the prefix length (figures 2-4, and examples 3.1 on page 1242 the first 24 bits are used as an index into TBL24, and will return an entry with the correct next hop (A)); and

performing a longest match procedure to update the group of entries to have most specific next hop and prefix length information for the group of entries (section 3 and examples 3.1, when a destination address arrives, a match to the respective table is performed based on the prefix length and group of entries is directed to the specific table based on prefix length to have the most specific next hop);

wherein checking includes

determining whether a given portion of an entry in the group of entries stores next hop and prefix information, or stores an index to a block of next hop and prefix information in

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another data structure (section 3 and examples 3.1, when a destination address arrives, a match to the respective table is performed based on the prefix length, if 24 bit prefix is less than 25 bits , the first table stores all possible route and provides Next hop is greater than 24 bits then indexed into the 2<sup>nd</sup> table); and

obtaining prefix length and next hop information for the entry based on the determination result (section 3 and examples 3.1, next hop information and prefix length is obtained based on example of two tables containing three routes].

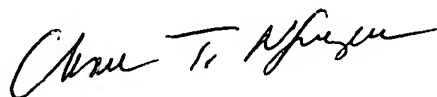
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chirag G Shah whose telephone number is 703-305-5639. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on 703-305-4366. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

kmd



CHAU NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600